

X  
Work Order ID 91694

October 15, 2012 2:39:37 PM

\*91694\*

Page 1

Item ID: D412-664-209TRN

Accept

\*N900040100\*

Setup

Start

\*NS1\*

Revision ID:

Item Name: Crosstube Turning Detail

Start Date: 15/10/2012 Start Qty: 1.00

\*1\*

Required Date: 29/10/2012 Req'd Qty: 1.00

\*1\*

Reference:

Approvals: Process Plan: ML5

QC

Date: 12-10-12 Tooling:

Date: SPC (Y/N):

Date:

Date:

Run

Start

\*NR1\*

Stop

\*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr								
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D412-664-249	Rev B(DEO)	0.00							
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100	MORI SEIKI CNC LATHE LARGE								
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*100*	Memo	0.00							
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Mori Seiki	1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA708								
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Mori Seiki CNC Lathe Large	2-Turn first side as per Folio FA708								
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	3-File transition lines smooth.								
--	---------------------------------	--	--	--	--	--	--	--	--

	FOLIO REV: _____								
--	------------------	--	--	--	--	--	--	--	--

	DWG REV: _____								
--	----------------	--	--	--	--	--	--	--	--

110	QC1- Inspect dimensions to dimension sheet	0.00							
-----	--	------	--	--	--	--	--	--	--

*110*	Memo	0.00							
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QC									
----	--	--	--	--	--	--	--	--	--

Quality Control									
-----------------	--	--	--	--	--	--	--	--	--

mar. 1  
12/11/02

mar. 1  
12/11/02

NCR: Yes / No

## WORK ORDER NON-CONFORMANCE / UPDATE

DOA: ✓ Date: 12/11/10QA Closed: ✓ Date:

Work Order: <u>91694</u>	DISPOSITION			AGAINST DEPARTMENT/PROCESS				
Part No. <u>D412-664-209TRW</u>	Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input checked="" type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
NCR No. <u>12-2014</u>	Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
	Use-as-is <input checked="" type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
	Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				

Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data									
Equip/Tooling									
Operator									
Material									
Setup									
Other									
Process									
Supplier									
Training									
Unapproved									

## FAULT CATEGORY

Landing Gear	General									
<input type="checkbox"/> Bending	<input type="checkbox"/> Bend	<input type="checkbox"/> Grain	<input type="checkbox"/> Ovalized	<input type="checkbox"/> Pressure/Forced						
<input type="checkbox"/> Centre Not Concentric to O/S	<input type="checkbox"/> BOM/Route	<input type="checkbox"/> Hardware	<input checked="" type="checkbox"/> Over/Under tolerance	<input type="checkbox"/> Temperature/Cure						
<input type="checkbox"/> Cracks	<input type="checkbox"/> Broken/Damaged	<input type="checkbox"/> Inspection Incomplete	<input type="checkbox"/> Part Incorrect	<input type="checkbox"/> Weld						
<input type="checkbox"/> Crushed/Crimped.	<input type="checkbox"/> Burrs	<input type="checkbox"/> Instructions Incomplete/Unclear	<input type="checkbox"/> Part Lost/Missing	<input type="checkbox"/> Wrong Stock Pulled						
<input type="checkbox"/> Cuffs	<input type="checkbox"/> Contamination	<input type="checkbox"/> Maintenance	<input type="checkbox"/> Part Moved							
<input type="checkbox"/> Heat Treat	<input type="checkbox"/> Countersink	<input type="checkbox"/> Mislabeled	<input type="checkbox"/> Positioned Wrong							
<input type="checkbox"/> Inspection Strip in Tube	<input type="checkbox"/> Cut Too Short	<input type="checkbox"/> Misread	<input type="checkbox"/> Power Loss/Surge							
<input type="checkbox"/> Ripples in Bend	<input type="checkbox"/> Drill Holes	<input type="checkbox"/> Offset								
<input type="checkbox"/> Torque Waves in Extrusion	<input type="checkbox"/> Drawing	<input type="checkbox"/> Out of Calibration								
<input type="checkbox"/> Turning Sequence	<input type="checkbox"/> Finish	<input type="checkbox"/> Out of Sequence								
<input type="checkbox"/> Wave/Twist in Tube	<input type="checkbox"/> Folio	<input type="checkbox"/> Outside Dimensions								

RC: WALL THICKNESS

**Work Order ID 91694**

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**\*91694\***

Page 2

**Item ID:** D412-664-209TRN

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

**Revision ID:**

**Item Name:** Crosstube Turning Detail

Stop

**\*NS2\***

**Start Date:** 15/10/2012 **Start Qty:** 1.00

**\*1\***

**Cust Item ID:**

**Required Date:** 29/10/2012 **Req'd Qty:** 1.00

**\*1\***

**Customer:**

**Reference:**

**Approvals:** **Process Plan:**

**Date:**

**Tooling:**

**Date:**

Run Start

**\*NR1\***

**QC:**

**Date:**

**SPC (Y/N):**

**Date:**

Stop

**\*NR2\***

**Sequence ID/  
Work Center ID**

120

**\*120\***

Mori Seiki

Mori Seiki CNC Lathe Large

**Operation  
Description**

MORI SEIKI CNC LATHE LARGE

**Set Up/  
Run Hours**

0.00

**Tool ID**

**Tool #**

**Plan  
Code**

**Accept  
Qty**

**Reject  
Qty**

**Reject  
Number**

**Insp.  
Stamp**

( Ø )

MORI L  
12/11/05

130

QC1- Inspect dimensions to dimension sheet

0.00

**\*130\***

QC

Quality Control

**Memo**

0.00

( Ø )

MORI L  
12/11/05

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data										
Equip/Tooling										
Operator										
Material										
Setup										
Other										
Process										
Supplier										
Training										
Unapproved										
FAULT CATEGORY										
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						

**Work Order ID 91694**

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**\*91694\***

Page 3

**Item ID:** D412-664-209TRN

Accept

**\*N900040100\***

Setup

Start

**\*NS1\***

**Revision ID:**

**Item Name:** Crosstube Turning Detail

**Start Date:** 15/10/2012 **Start Qty:** 1.00

**\*1\***

**Cust Item ID:**

**Required Date:** 29/10/2012 **Req'd Qty:** 1.00

**\*1\***

**Customer:**

**Reference:**

**Approvals:** Process Plan:

Date:

Tooling:

Date:

Run

Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***

**Sequence ID/  
Work Center ID**

**Operation  
Description**

**Set Up/  
Run Hours**

**Tool ID**

**Tool #**

**Plan  
Code**

**Accept  
Qty**

**Reject  
Qty**

**Reject  
Number**

**Insp.  
Stamp**

140

QC8- Inspect parts - second check

0.00

**\*140\***

QC

Quality Control

*JW* 12-11-7

150

**\*150\***

HandFXtube

Hand Finishing Crosstubes

Memo

0.00

1- PRESSURE WASH X-TUBE INSIDE AND OUT

2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE

*MO/RM* 12-11-7

160

**\*160\***

QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

*DAS  
03  
9-89*

*D*

12-11-7

NCR: Yes / No

## **WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: Date:

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION			AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	Skid-tube <input type="checkbox"/> Machining <input type="checkbox"/> Thermoforming <input type="checkbox"/> Large Fab <input type="checkbox"/>	Crosstube <input type="checkbox"/> Small Fab <input type="checkbox"/> Finishing <input type="checkbox"/> Composite <input type="checkbox"/>	Water Jet <input type="checkbox"/> Prod. Eng. Coor. <input type="checkbox"/> Rec/Store/Packaging <input type="checkbox"/> Supplier <input type="checkbox"/>	Engineering <input type="checkbox"/> Quality <input type="checkbox"/> Other <input type="checkbox"/>				
Part No. _____											
NCR No. _____											
Root Cause		Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data	<input type="checkbox"/>										
Equip/Tooling	<input type="checkbox"/>										
Operator	<input type="checkbox"/>										
Material	<input type="checkbox"/>										
Setup	<input type="checkbox"/>										
Other	<input type="checkbox"/>										
Process	<input type="checkbox"/>										
Supplier	<input type="checkbox"/>										
Training	<input type="checkbox"/>										
Unapproved	<input type="checkbox"/>										
FAULT CATEGORY											
Landing Gear			General								
Bending	<input type="checkbox"/>	Centre Not Concentric to O/S	<input type="checkbox"/>	Bend	<input type="checkbox"/>	Grain	<input type="checkbox"/>	Ovalized	<input type="checkbox"/>	Pressure/Forced	
Cracks	<input type="checkbox"/>		<input type="checkbox"/>	BOM/Route	<input type="checkbox"/>	Hardware	<input type="checkbox"/>	Over/Under tolerance	<input type="checkbox"/>	Temperature/Cure	
Crushed/Crimped	<input type="checkbox"/>		<input type="checkbox"/>	Broken/Damaged	<input type="checkbox"/>	Inspection Incomplete	<input type="checkbox"/>	Part Incorrect	<input type="checkbox"/>	Weld	
Cuffs	<input type="checkbox"/>		<input type="checkbox"/>	Burrs	<input type="checkbox"/>	Instructions Incomplete/Unclear	<input type="checkbox"/>	Part Lost/Missing	<input type="checkbox"/>	Wrong Stock Pulled	
Heat Treat	<input type="checkbox"/>		<input type="checkbox"/>	Contamination	<input type="checkbox"/>	Maintenance	<input type="checkbox"/>	Part Moved	<input type="checkbox"/>		
Inspection Strip in Tube	<input type="checkbox"/>		<input type="checkbox"/>	Countersink	<input type="checkbox"/>	Mislabeled	<input type="checkbox"/>	Positioned Wrong	<input type="checkbox"/>		
Ripples in Bend	<input type="checkbox"/>		<input type="checkbox"/>	Cut Too Short	<input type="checkbox"/>	Misread	<input type="checkbox"/>	Power Loss/Surge	<input type="checkbox"/>		
Torque Waves in Extrusion	<input type="checkbox"/>		<input type="checkbox"/>	Drill Holes	<input type="checkbox"/>	Offset	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Turning Sequence	<input type="checkbox"/>		<input type="checkbox"/>	Drawing	<input type="checkbox"/>	Out of Calibration	<input type="checkbox"/>		<input type="checkbox"/>		
Wave/Twist in Tube	<input type="checkbox"/>		<input type="checkbox"/>	Finish	<input type="checkbox"/>	Out of Sequence	<input type="checkbox"/>		<input type="checkbox"/>		
	<input type="checkbox"/>		<input type="checkbox"/>	Folio	<input type="checkbox"/>	Outside Dimensions	<input type="checkbox"/>		<input type="checkbox"/>		



NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			<b>DISPOSITION</b>		<b>AGAINST DEPARTMENT/PROCESS</b>						
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>				
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>				
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>				
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>					
<b>Root Cause</b>	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data											
Equip/Tooling											
Operator											
Material											
Setup											
Other											
Process											
Supplier											
Training											
Unapproved											
<b>FAULT CATEGORY</b>											
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio		<input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  <hr/> <hr/>	
										<input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled	
										<input type="checkbox"/> Other	

**Picklist Print**

October-15-12 2:39:40 PM

Page 1

Work Order ID: 91694

**\*91694\***  
**\*D412-664-209TRN\***

Parent Item: D412-664-209TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 15/10/2012

Required Date: 29/10/2012

Start Qty: 1.00

Required Qty: 1.00

**Comments:**

IPP Rev:A New Issue 08-03-06 DD verified by:ec  
 IPP Rev B 08.04.02 Removed polish EC verified by: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6009-129		Manufactured	No			110	Each	1.0000	1	1			**

**\*D6009-129\***

Crosstube Material

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	1	
69801	1	

75630

1 29/10/12 10/10/12

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION			AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>				
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>				
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>				
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>					
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data											
Equip/Tooling											
Operator											
Material											
Setup											
Other											
Process											
Supplier											
Training											
Unapproved											
FAULT CATEGORY											
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions							
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other							

DART AEROSPACE LTD	Work Order:	91694
Description: Crosstube Assembly (412 Low Aft)	Part Number:	D412-664-249
Inspection Dwg: D412-664-249 Rev: B		Page 1 of 2

### FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.625	+/-0.010	.625	/	vern	cwc-08
	2.680	+0.005/-0.000	2.681	/		
	2.680	+0.005/-0.000	2.683	/		
	2.687	+0.005/-0.000	2.690	/		
	2.793	+0.005/-0.000	2.798	/		
	2.930	+0.005/-0.000	2.934	/		
	3.067	+0.005/-0.000	3.070	/		
	3.205	+0.005/-0.000	3.209	/		
	3.358	+0.005/-0.000	3.358	/		
	3.378	+0.005/-0.000	3.382	/		
	3.500	+0.005/-0.000	3.500	/		
SIDE B	0.625	+/-0.010	.625	/	vern	cwc-08
	2.680	+0.005/-0.000	2.682	/		
	2.680	+0.005/-0.000	2.683	/		
	2.687	+0.005/-0.000	2.690	/		
	2.793	+0.005/-0.000	2.798	/		
	2.930	+0.005/-0.000	2.934	/		
	3.067	+0.005/-0.000	3.071	/		
	3.205	+0.005/-0.000	3.209	/		
	3.358	+0.005/-0.000	3.367	/		
	3.378	+0.005/-0.000	3.380	/		
	3.500	+0.005/-0.000	3.500	/		
	0.127.82	+/-0.020	127.820	/	tape	LG-22

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data										
Equip/Tooling										
Operator										
Material										
Setup										
Other										
Process										
Supplier										
Training										
Unapproved										
FAULT CATEGORY										
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						

DART AEROSPACE LTD

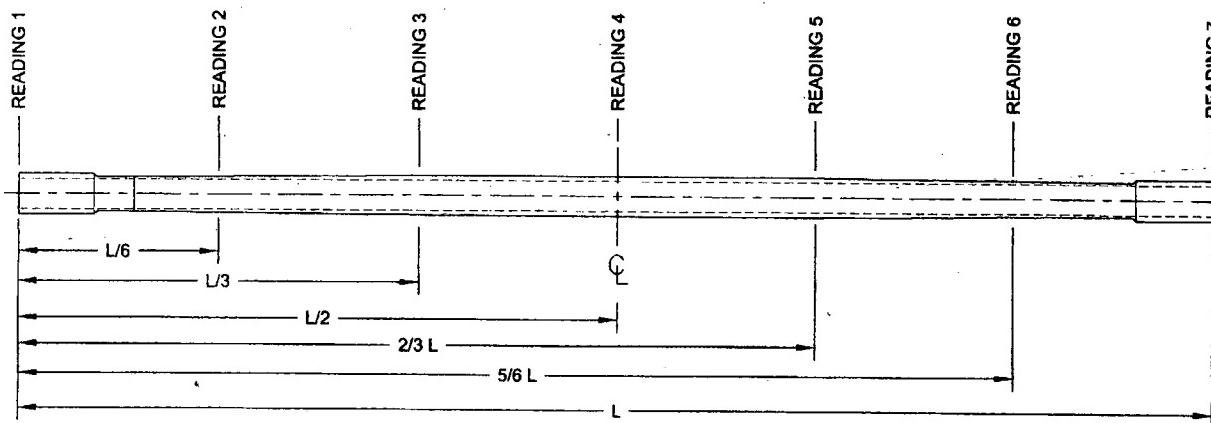
Work Order: 91694

Description: Crosstube Assembly (412 Low Aft)

Part Number: D412-664-249

Inspection Dwg: D412-664-249 Rev: B

Page 2 of 2

WALL THICKNESS MEASUREMENT

Location	WALL THICKNESS MEASUREMENT (IN)				Deviation $\Delta w$ (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.217	.239	.250	.230	.033	
READING 2 L= 19	.204	.262	.295	.218	.091	$Dw_3 = 0.22$ B
READING 3 L= 38	.365	.430	.464	.399	.099	$Dw_4 = 0.392$
READING 4 L= 63	.643	.640	.655	.636	.019	0.073"
READING 5 L= 38	.452	.417	.373	.401	.079	
READING 6 L= 19	.250	.258	.252	.242	.016	
READING 7 L= Cuff	.234	.233	.235	.236	.003	

## Calibration Result

Actual Block Thickness: +100 .500

Sitescan 250 Measured Thickness: +100 .500

Measured by:	<i>M. M. L.</i>
Date:	12/11/05

Audited by:	<i>JW</i>
Date:	12-11-8

Preliminary Approval:	
Date:	

Rev	Date	Change	Revised by	Approved
A	08.11.07	New Issue (P/O D212-664-209)	KJ/EC	
B	10.11.12	Dwg Rev updated	KJ	
B	12.06.04	Wall thickness form added	KJ	<i>[Signature]</i> <i>[Signature]</i>

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS								
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>						
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>						
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>						
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>							
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector				
Doc/Data													
Equip/Tooling													
Operator													
Material													
Setup													
Other													
Process													
Supplier													
Training													
Unapproved													
FAULT CATEGORY													
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  <input type="checkbox"/> Other			

8 7 6 5 4 3 2 1

D

D

Item	Qty	Part Number	Description
1	X	D412-664-249	CROSSTUBE ASSEMBLY (412 LOW AFT)
2	1	D6009-129	CROSSTUBE
3	2	D2856-600-1009	ABRASION STRIP
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D3595-063-570	RUBBER CUSHION
7	2	D3660-1	CUFF
8	44	CR32124-07	RIVET (OR M78853-4-07)
9	4	MS21920-28	CLAMP
10	2	MS21920-30	CLAMP (OR MS21920-32)
11	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
12	A/R	SIKAFLEX-241-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

**GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 127.826±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-249" AND BATCH NUMBER ON INSIDE OF CUDD USING VIBRATING STYLUS.
- 7) WEIGHT: 42.5 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 008
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 17) INSTALL D3660-1 CUDD AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUDD AND CROSSTUBE. SEAL EDGE OF CUDD TO ENSURE NO GAPS.
- 18) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

REVIEW BY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 91694 MLJ

12-10-15

② DEO ATTACHED  
RELEASED  
2009-10-29  
M

B	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	99	DART AEROSPACE LTD	
DRAWN	RF	HAWKSLEY, ONTARIO, CANADA	
CHECKED	99	DRAWING NO.	REV. B
MFG. APPR.	DA	D412-664-249	SHEET 1 OF 4
APPROVED	100	TITLE	SCALE
DE APPR.	100	CROSSTUBE (412 LOW AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD. THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY OTHER PURPOSE OR DISCLOSED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

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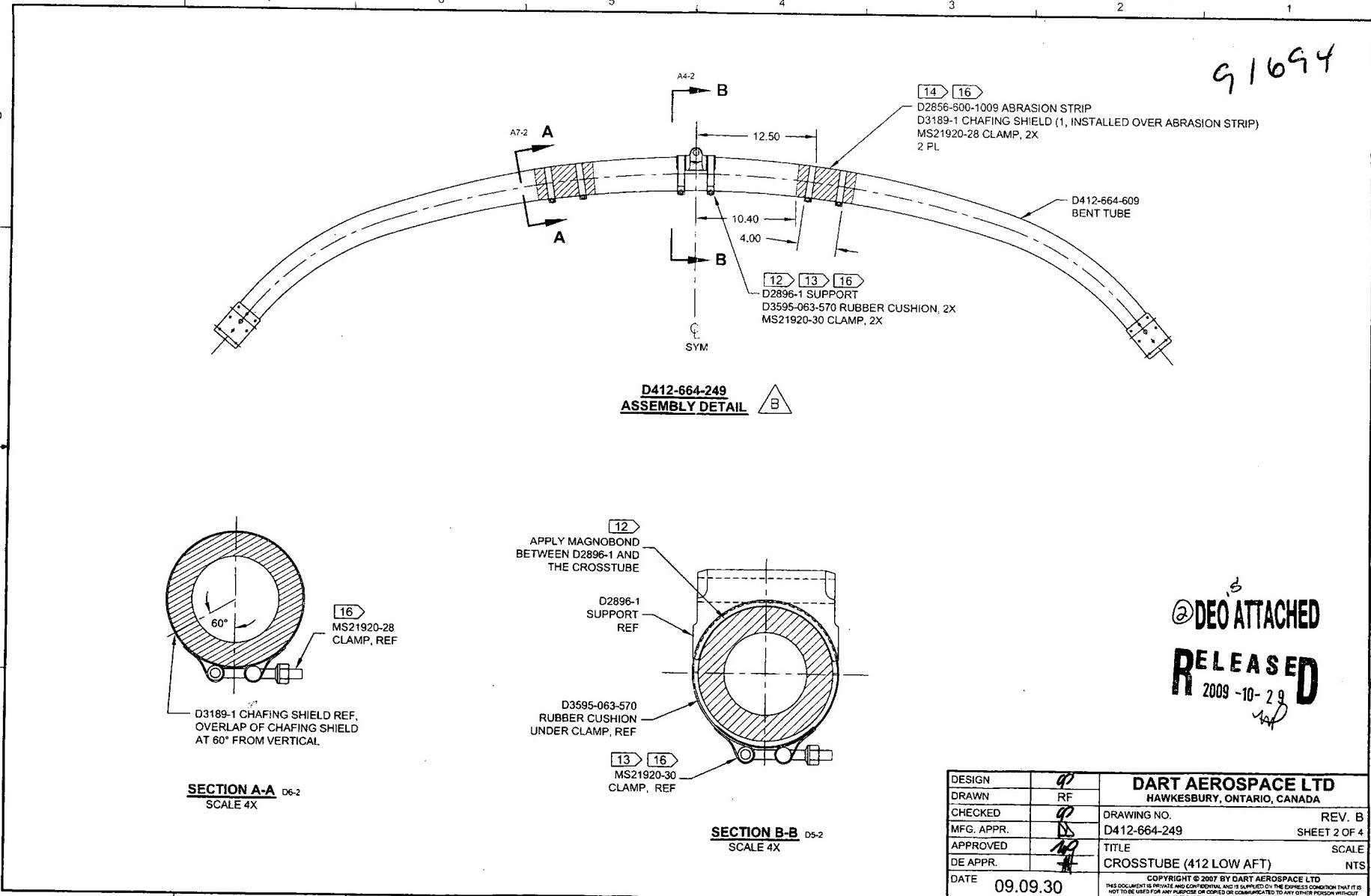
NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS						
			Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	Skid-tube <input type="checkbox"/> Machining <input type="checkbox"/> Thermoforming <input type="checkbox"/> Large Fab <input type="checkbox"/>	Crosstube <input type="checkbox"/> Small Fab <input type="checkbox"/> Finishing <input type="checkbox"/> Composite <input type="checkbox"/>	Water Jet <input type="checkbox"/> Prod. Eng. Coor. <input type="checkbox"/> Rec/Store/Packaging <input type="checkbox"/> Supplier <input type="checkbox"/>	Engineering <input type="checkbox"/> Quality <input type="checkbox"/> Other <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data <input type="checkbox"/> Equip/Tooling <input type="checkbox"/> Operator <input type="checkbox"/> Material <input type="checkbox"/> Setup <input type="checkbox"/> Other <input type="checkbox"/> Process <input type="checkbox"/> Supplier <input type="checkbox"/> Training <input type="checkbox"/> Unapproved <input type="checkbox"/>											
FAULT CATEGORY											
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio  <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled  <input type="checkbox"/> Other	



DESIGN	99	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	99	DRAWING NO.
MFG. APPR.	99	REV. B
APPROVED	99	D412-664-249
DE APPR.	99	SHEET 2 OF 4
DATE	09.09.30	TITLE
		CROSSTUBE (412 LOW AFT)
		NTS
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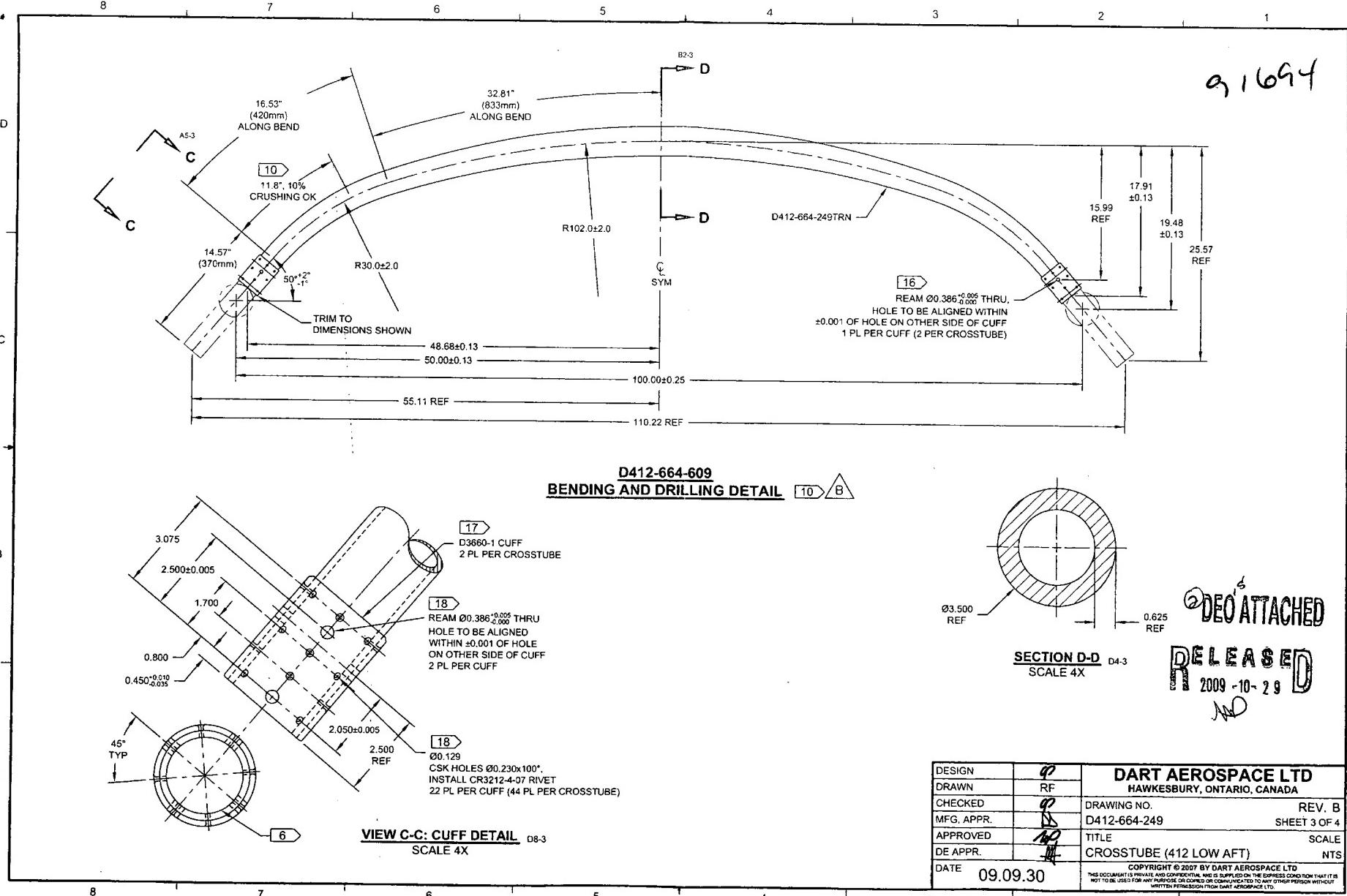
NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS									
			Rework Scrap Use-as-is Work Order Update	Skid-tube Machining Thermoforming Large Fab	Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier	Engineering Quality Other							
Part No. _____		NCR No. _____												
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector					
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Equip/Tooling														
Operator														
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Process														
Supplier														
Training														
Unapproved														
FAULT CATEGORY														
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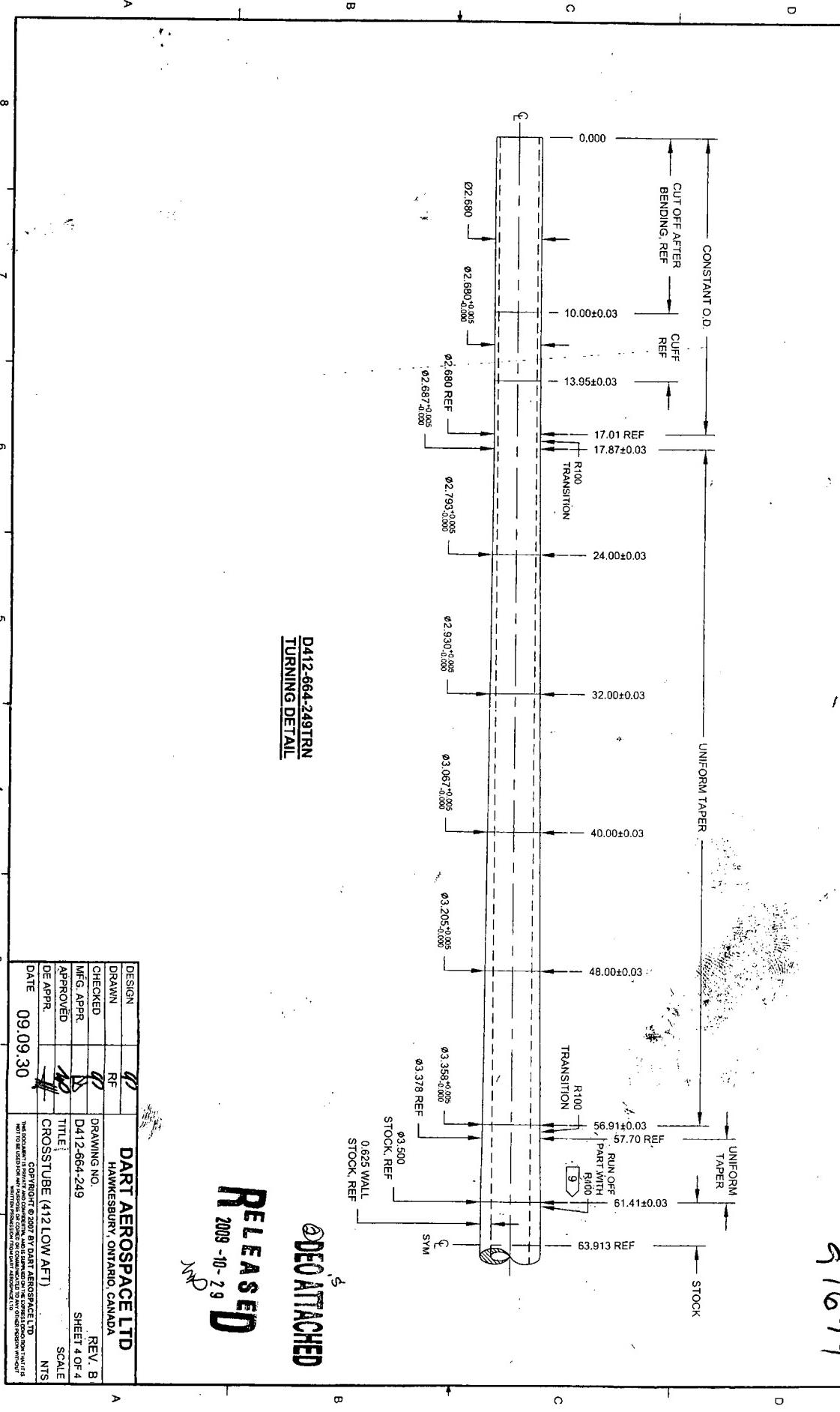
NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data										
Equip/Tooling										
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				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						



**RELEASED  
2009-10-29**

DEO ATTACHED

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
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Equip/Tooling										
Operator										
Material										
Setup										
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Supplier										
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FAULT CATEGORY										
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				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						

DRAWING NO. D412-664-249	TITLE CROSSTUBE ASS'Y (412 LOW AFT)	REV. B	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D412-664-249-B-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN <i>QP</i>	CHECKED <i>Sc</i>	MFG. APPR. <i>R</i>	APPROVED <i>MD</i>	DE APPR. <i>MM</i>			
DATE 11.05.25	DATE 11.05.31	DATE 11.05.31	DATE 11.05.31	DATE 11.05.31			

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty -249	Part Number	Description
3	0	D2856-600-1009	ABRASION STRIP

WAS:

3	2	D2856-600-1009	ABRASION STRIP

NOTE 14, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.

**RELEASED**  
2011-07-14  
*MP*

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

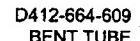
Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data										
Equip/Tooling										
Operator										
Material										
Setup										
Other										
Process										
Supplier										
Training										
Unapproved										
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<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						

91694

DRAWING NO. D412-664-249	TITLE CROSSTUBE ASS'Y (412 LOW AFT)	REV. B	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D412-664-249-B-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN <i>qp</i>	CHECKED <i>Sc</i>	MFG. APPR. <i>E</i>	APPROVED <i>W</i>	DE APPR. <i>W</i>		
DATE 11.05.25	DATE 11.05.31	DATE 11.05.31	DATE 11/05/31	DATE 11.05.31		

IS:

 D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)  
MS21920-28 CLAMP, 2X  
2 PL

 D412-664-609  
BENT TUBE

WAS:

 D2856-600-1009 ABRASION STRIP  
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)  
MS21920-28 CLAMP, 2X  
2 PL

 D3189-1  
REF

 C  
SYM

**RELEASED**  
2011-07-14  
*MP*

**D412-664-249**  
**ASSEMBLY DETAIL**

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION			AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>				
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>				
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>				
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>					
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data											
Equip/Tooling											
Operator											
Material											
Setup											
Other											
Process											
Supplier											
Training											
Unapproved											
FAULT CATEGORY											
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions							
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other							

91694

DRAWING NO. D412-664-249	TITLE CROSSTUBE ASS'Y (412 LOW AFT)	REV. B	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D412-664-249-B-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>q</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>E</i>	APPROVED <i>JAF</i>	DE APPR. <i>MM</i>		
DATE 11.09.07	DATE 11.09.19	DATE 15.09.19	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19	

**PURPOSE:**

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

**CHANGE:**

IS:

Item	Qty	Part Number	Description
	-249		
11	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD

WAS:

11	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
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NOTE 12 &amp; 16, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

WAS:

- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED  
2011-09-29  
*[Handwritten signature]*

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework Scrap Use-as-is Work Order Update	Skid-tube Machining Thermoforming Large Fab	Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier	Engineering Quality Other			
Part No. _____		NCR No. _____								
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data										
Equip/Tooling										
Operator										
Material										
Setup										
Other										
Process										
Supplier										
Training										
Unapproved										
FAULT CATEGORY										
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						

91694

DRAWING NO. D412-664-249	TITLE CROSSTUBE (412 LOW AFT)	REV. B	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D412-664-249-B-3	SHEET NO. SHEET 1 OF 3	SCALE NTS
DRAWN <i>90</i>	CHECKED <i>b</i>		MFG. APPR. <i>BS</i>	APPROVED <i>10</i>	DE APPR. <i>MM</i>	
DATE 12.08.21	DATE 12.08.30		DATE 12.08.30	DATE 12.08.30	DATE 12.08.30	

**PURPOSE:**

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890. UPDATE INSTALLATION OF CHAFING SHIELDS AND REDUCE TORQUE TO 40-50 IN-LBS. THIS ENGINEERING ORDER SUPERCEDES DEO D412-664-249-B-1

**CHANGE:**

PARTS LIST IS AMENDED AS FOLLOWS:

**IS:**

Item	Qty -249	Part Number	Description
3	0	D2856-600-1009	ABRASION STRIP

RELEASED  
2012-09-04  
*NP*

**WAS:**

3	2	D2856-600-1009	ABRASION STRIP
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NOTE 14 AND 16 ON SHEET 1 IS AMENDED AS FOLLOWS:

**IS:**

- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

**WAS:**

- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

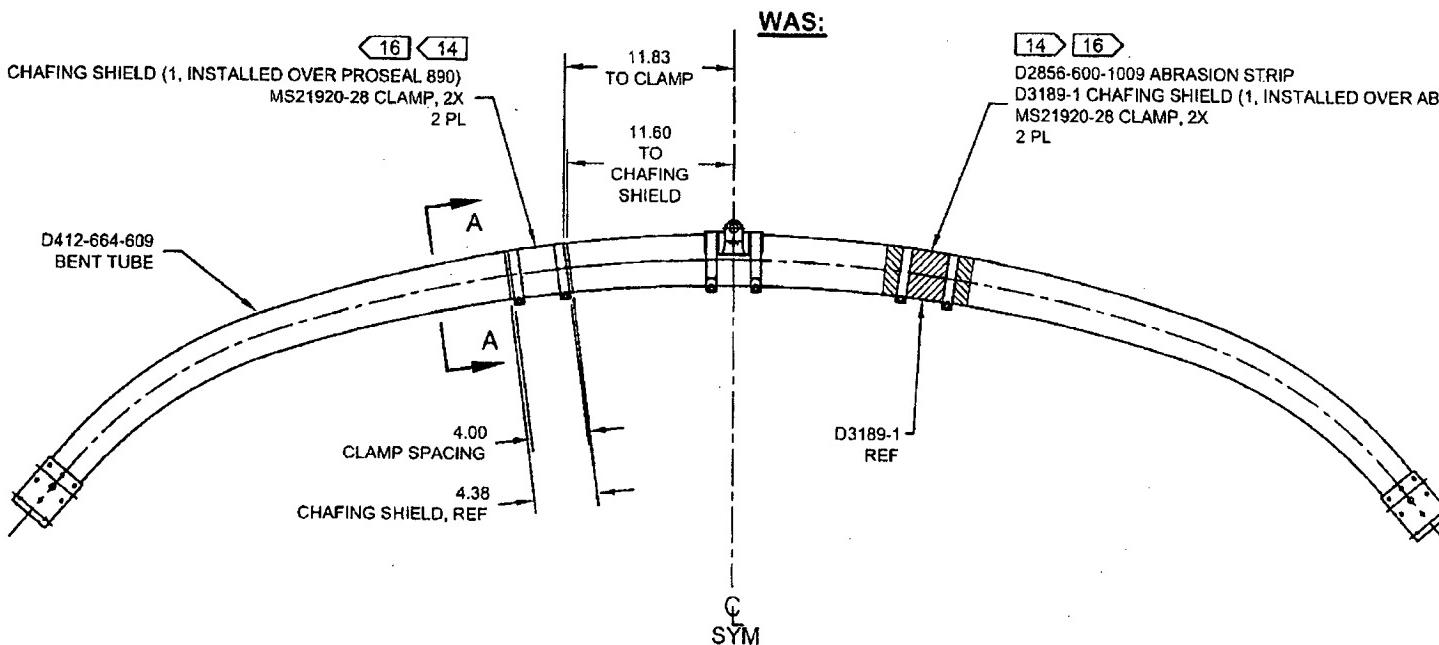
Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS										
			Rework Scrap Use-as-is Work Order Update	Skid-tube Machining Thermoforming Large Fab	Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier	Engineering Quality Other								
Root Cause		Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector					
Doc/Data															
Equip/Tooling															
Operator															
Material															
Setup															
Other															
Process															
Supplier															
Training															
Unapproved															
FAULT CATEGORY															
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions							<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  <hr/> <hr/>			<input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled  <hr/> <hr/>	

9169Y

DRAWING NO. D412-664-249	TITLE CROSSTUBE (412 LOW AFT)	REV. B	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>	D.E.O. NO. D412-664-249-B-3	SHEET NO. SHEET 2 OF 3	SCALE NTS
DRAWN <i>gp</i>	CHECKED <i>AS</i>	MFG. APPR. <i>AS</i>	APPROVED <i>WJ</i>	DE APPR. <i>AS</i>		
DATE 12.08.21	DATE 12.08.21	DATE 12.08.29	DATE 12.08.29	DATE 12.08.29	DATE 12.08.29	

IS:

D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)  
MS21920-28 CLAMP, 2X  
2 PL

WAS:

D2856-600-1009 ABRASION STRIP  
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)  
MS21920-28 CLAMP, 2X  
2 PL

**D412-664-249**  
**ASSEMBLY DETAIL**

RELEASED  
2012-09-04  
*WJ*

NCR: Yes / No

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

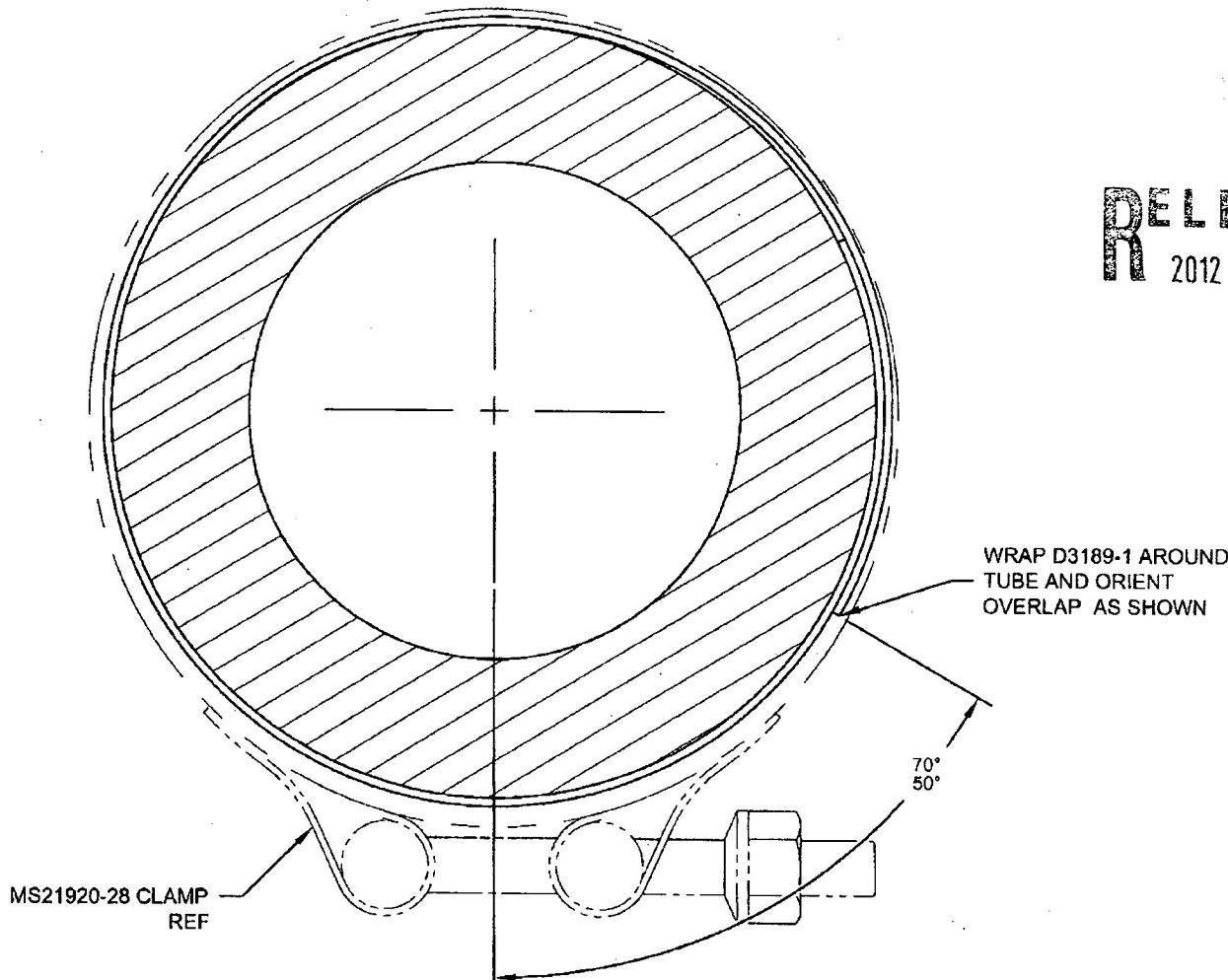
**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework Scrap Use-as-is Work Order Update	Skid-tube Machining Thermoforming Large Fab	Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier	Engineering Quality Other			
Part No. _____		NCR No. _____								
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data										
Equip/Tooling										
Operator										
Material										
Setup										
Other										
Process										
Supplier										
Training										
Unapproved										
FAULT CATEGORY										
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						

9/694

DRAWING NO. D412-664-249	TITLE CROSSTUBE (412 LOW AFT)	REV. B	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>		D.E.O. NO. D412-664-249-B-3	SHEET NO. SHEET 3 OF 3	SCALE NTS
DRAWN <i>RP</i>	CHECKED <i>J</i>	MFG. APPR. <i>AA</i>	APPROVED <i>MD</i>	DE APPR. <i>AA</i>			
DATE 12.08.21	DATE 12.08.22	DATE 12.08.29	DATE 12.08.29	DATE 12.08.29	DATE 12.08.29	DATE 12.08.29	



**SECTION A-A**  
CHAFING SHIELD DETAIL  
VIEW ROTATED, NOT TO SCALE

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WRITTEN PERMISSION FROM DART AEROSPACE LTD.

NCR: Yes / No

DQA: Date:

# WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____				DISPOSITION		AGAINST DEPARTMENT/PROCESS					
				Rework Scrap Use-as-is Work Order Update	Skid-tube Machining Thermoforming Large Fab	Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier	Engineering Quality Other			
Part No. _____  NCR No. _____											
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data											
Equip/Tooling											
Operator											
Material											
Setup											
Other											
Process											
Supplier											
Training											
Unapproved											
FAULT CATEGORY											
Landing Gear				General							
Bending	Bend	Grain	Ovalized	Pressure/Forced							
Centre Not Concentric to O/S	BOM/Route	Hardware	Over/Under tolerance	Temperature/Cure							
Cracks	Broken/Damaged	Inspection Incomplete	Part Incorrect	Weld							
Crushed/Crimped	Burrs	Instructions Incomplete/Unclear	Part Lost/Missing	Wrong Stock Pulled							
Cuffs	Contamination	Maintenance	Part Moved								
Heat Treat	Countersink	Mislabeled	Positioned Wrong								
Inspection Strip in Tube	Cut Too Short	Misread	Power Loss/Surge								
Ripples in Bend	Drill Holes	Offset									
Torque Waves in Extrusion	Drawing	Out of Calibration									
Turning Sequence	Finish	Out of Sequence									
Wave/Twist in Tube	Folio	Outside Dimensions									